ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 247 CLASS II & IV PC REPORT

OF

Product Name:	**802.11 a/b/g/n/ac and Bluetooth Module**
Brand Name:	acer
Model No.:	**7265NGW**
Model Difference:	**N/A**
FCC ID:	**HLZ7265NG**
IC:	**1754F-7265NG**
Report No.:	**E2/2017/30008**
Issue Date:	**Apr. 12, 2017**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-247 issue 2 :2017**
Prepared for:	**Acer Incorporated 8F., NO. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333**

ilac-MRA TAF Testing Laboratory 0513

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VERIFICATION OF COMPLIANCE

Applicant:	Acer Incorporated 8F., NO. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan
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Brand Name:	acer
Model No.:	7265NGW
Model Difference:	N/A
FCC ID:	HLZ7265NG
IC:	1754F-7265NG
File Number:	E2/2017/30008
Date of test:	Mar. 08, 2017 ~ Apr. 07, 2017
Date of EUT Received:	Mar. 08, 2017

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.
The test results of this report relate only to the tested sample identified in this report.

Test By:	Aken Huang ***Aken Huang / Engineer***	***Date:***	Apr. 12, 2017
Prepared By:	Karen Huang ***Karen Huang / Clerk***	***Date:***	Apr. 12, 2017
Approved By:	Jim Chang ***Jim Chang / Asst. Manager***	***Date:***	Apr. 12, 2017

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Revision History

Report Number	Revision	Description	Issue Date
E2/2017/30008	Rev.00	Initial creation of document	Apr. 12, 2017

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1 GENERAL INFORMATION

1.1 Product description

General Information of Host:

Product Name of Host:	Notebook Computer	
Brand Name:	acer	
Marketing Name of Host:	ZHV	
Model No. of Host:	N16Q15	
Model Difference:	N/A	
Hardware Version:	R1.1	
Software Version:	Win 10	
Model No. of BT/WLAN Module:	7265NGW	
Module FCC ID:	HLZ7265NG	
Module IC:	1754F-7265NG	
Scope:	The test report covers the radiated emissions requirements of the standards referenced in the report to allow system level approval of the module in this specific host.	
Class II & Class IV Permissive change:	802.11 a/b/g/n/ac and Bluetooth Module INSTALLED IN Notebook Computer	
Power Supply:	15.2Vdc from Rechargeable Li-polymer Battery Pack or 19V by AC/DC Power Adapter	
	Battery:	Model No.: AC14B8K, Supplier: LG
	Adapter:	Model No.: PA-1450-26AC, Supplier: LITE-ON

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Average) / EIRP	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b: 17.09dBm b: 19.12 (EIRP) g: 17.34dBm g: 19.37dBm (EIRP)	DSSS OFDM	b: 12M8D2W g: 17M2D7W
11n (2.4GHz)	HT20 2412-2462	11	19.86dBm (MIMO) 24.90 (EIRP)	OFDM	18M4D7W
11n (2.4GHz)	HT40 2422-2452	7	16.36dBm (MIMO) 21.40 (EIRP)	OFDM	36M3D7W
Antenna Designation:		PIFA Antenna, 1. Gain:0.55dBi (Main) 2. Gain: 2.03dBi (Aux)			
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:		802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 HT20 MHz: 6.5 – 72.5Mbps 802.11 HT40 MHz: 13.5 – 150Mbps			

The 2.4G max antenna gain is -2.09dBi which was choosing for Radiated Spurious Emission test.

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

FCC KDB 662911 D01 Multiple Transmitter Output

Canada RSS-247 issue 2: 2017

RSS-Gen Issue 4:2014

ANSI C63.10:2013

Note:

All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)FCC Registration Numbers are: 735305

Canada Registration Number: 4620A-5

1.4 Special Accessories

There is no special accessory used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plan. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.247(b) (3)	RSS-247 §5.4 (2)	Peak Output Power	Compliant
§15.247(d)	RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	-	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

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RADIATED EMISSION TEST:

RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	6	DSSS	1	Aux
RADIATED BAND EDGE EMISSION TEST					
MODE	MODE	MODE	MODE	MODE	MODE
802.11b	1 to 11	1, 6, 11	DSSS	1	Aux
802.11g	1 to 11	1, 6, 11	OFDM	6	Aux
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO

Note:
The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E2 mode position was tested as resulted in pre-scanned measurement.

Pre-scanned was done on Antenna Main and Antenna Aux, and Antenna Main results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on Antenna Aux (2.4GHz) to be presented on this test report.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	1	Aux
802.11g	1 to 11	1, 6, 11	OFDM	6	Aux
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55dB (for Spectrum) +/- 1.42 dB (for Power Meter)
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
99% Power Bandwidth	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6 PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017
Power Meter	Anritsu	ML2496A	1326001	06/23/2016	06/22/2017
Power Sensor	Anritsu	MA2411B	1315048	06/23/2016	06/22/2017
Power Sensor	Anritsu	MA2411B	1315049	06/23/2016	06/22/2017
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017

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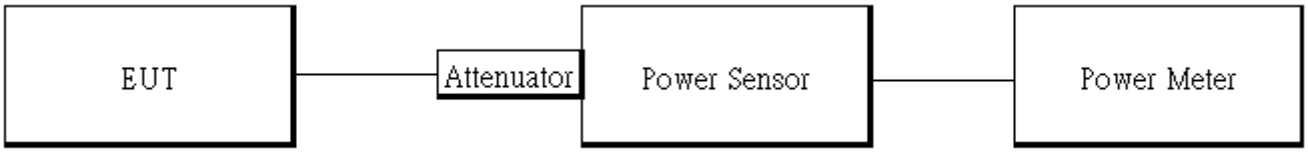
6.3 Test Set-up:

Power Meter:



6.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

   Power Meter:

   It is used as the auxiliary test equipment to conduct the output power measurement.
4. Record the max. Reading as observed from Spectrum or Power Meter.
5. For MIMO operation, measurement is done per chain basis, and then sum the simultaneous transmitting output in linear.

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6.5 Measurement Result (Worst Case Data Rate):

802.11b

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	19.11	81.47	1 Watt = 30
6	2437	1	**20.38**	109.14	1 Watt = 30
11	2462	1	19.32	85.51	1 Watt = 30

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	1	15.92	39.08	1 Watt = 30
6	2437	1	17.09	51.17	1 Watt = 30
11	2462	1	15.89	38.82	1 Watt = 30

802.11g

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	19.69	93.11	1 Watt = 30
6	2437	1	**22.16**	164.44	1 Watt = 30
11	2462	1	18.39	69.02	1 Watt = 30

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	1	14.34	27.16	1 Watt = 30
6	2437	1	17.34	54.20	1 Watt = 30
11	2462	1	12.63	18.32	1 Watt = 30

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802.11n_HT20

CH	Frequency (MHz)	DATA RATE	Peak Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
1	2412	MCS8	16.88	17.28	20.09	102.209	30dBm	PASS
6	2437	MCS8	22.17	22.05	**25.12**	**325.141**	30dBm	PASS
11	2462	MCS8	17.27	17.46	20.38	109.052	30dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
1	2412	MCS8	11.34	11.84	14.61	28.890	30dBm	PASS
6	2437	MCS8	16.75	16.95	19.86	96.860	30dBm	PASS
11	2462	MCS8	11.96	11.78	14.88	30.770	30dBm	PASS

802.11n_HT40

CH	Frequency (MHz)	DATA RATE	Peak Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
3	2422	MCS8	14.46	14.45	17.47	55.787	30 dBm	PASS
6	2437	MCS8	19.23	19.55	**22.40**	**173.910**	30 dBm	PASS
9	2452	MCS8	14.52	14.86	17.70	58.934	30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
3	2422	MCS8	9.23	9.28	12.27	16.848	30 dBm	PASS
6	2437	MCS8	13.45	13.25	16.36	43.266	30 dBm	PASS
9	2452	MCS8	9.26	9.46	12.37	17.264	30 dBm	PASS

**** Note: The duty cycle factor is compensated back to obtain the maximum value of the measurement in average.***

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EIRP Measurement:

802.11b

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	15.92	39.084	2.03	17.95	36	PASS
6	2437	**17.09**	**51.168**	2.03	**19.12**	36	PASS
11	2462	15.89	38.815	2.03	17.92	36	PASS

802.11g

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	14.34	27.164	2.03	16.37	36	PASS
6	2437	**17.34**	**54.200**	2.03	**19.37**	36	PASS
11	2462	12.63	18.323	2.03	14.66	36	PASS

802.11n_HT20 (MIMO)

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	14.61	28.907	5.04	19.65	36	PASS
6	2437	**19.86**	**96.828**	5.04	**24.90**	36	PASS
11	2462	14.88	30.761	5.04	19.92	36	PASS

802.11n_HT40 (MIMO)

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
3	2422	12.27	16.866	5.04	17.31	36	PASS
6	2437	**16.36**	**43.251**	5.04	**21.40**	36	PASS
9	2452	12.37	17.258	5.04	17.41	36	PASS

* Note: EIRP = Average Power + Gain, where the nominal gain of the antenna 2.03dBi for 2.4GHz (MIMO), where MIMO gain = directive gain + nominal gain.

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7 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

7.1 Standard Applicable:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

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7.2 Measurement Equipment Used:

SGS 966 Chamber No.C					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2016	07/23/2017
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-26	100780	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2016	05/03/2017
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

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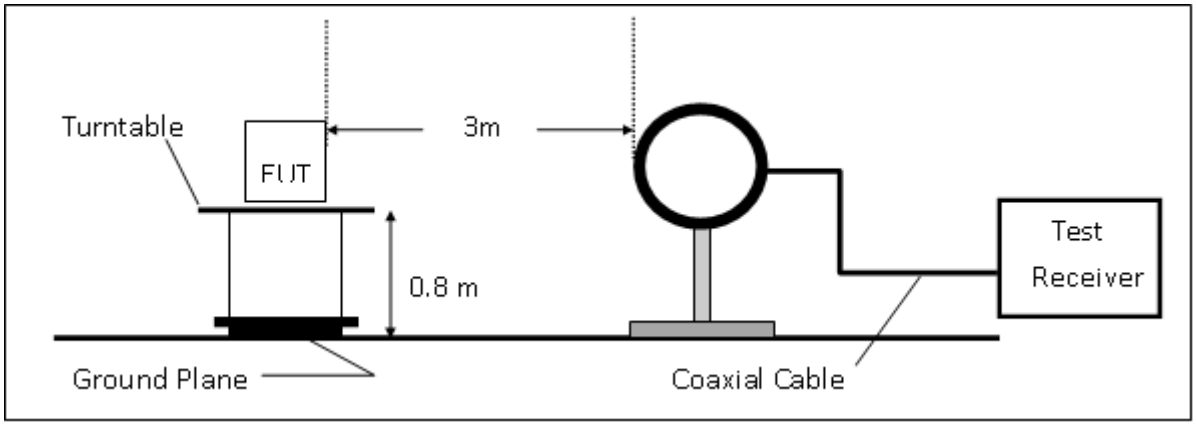
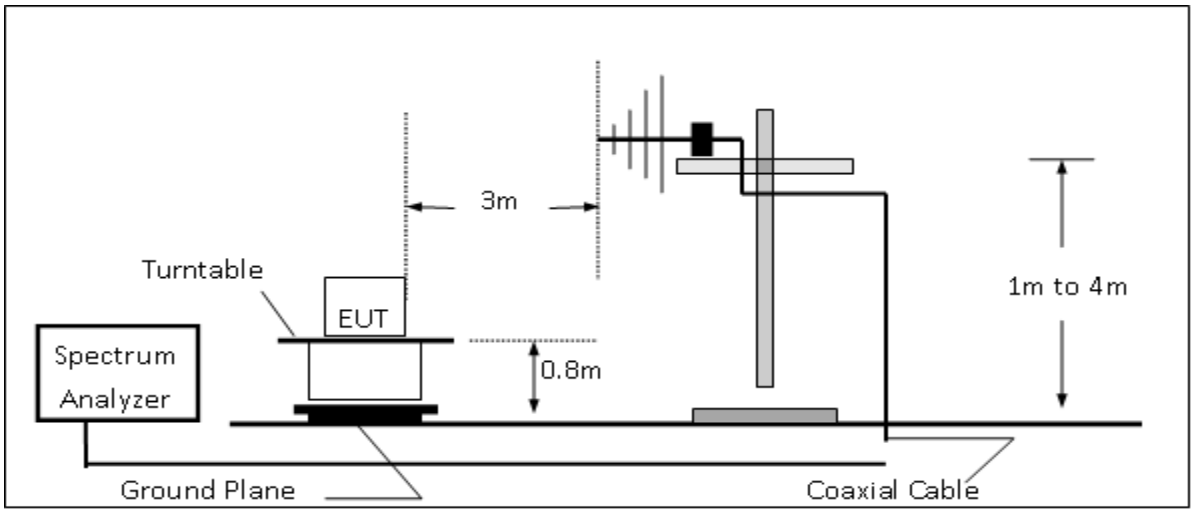
7.3 Test SET-UP:

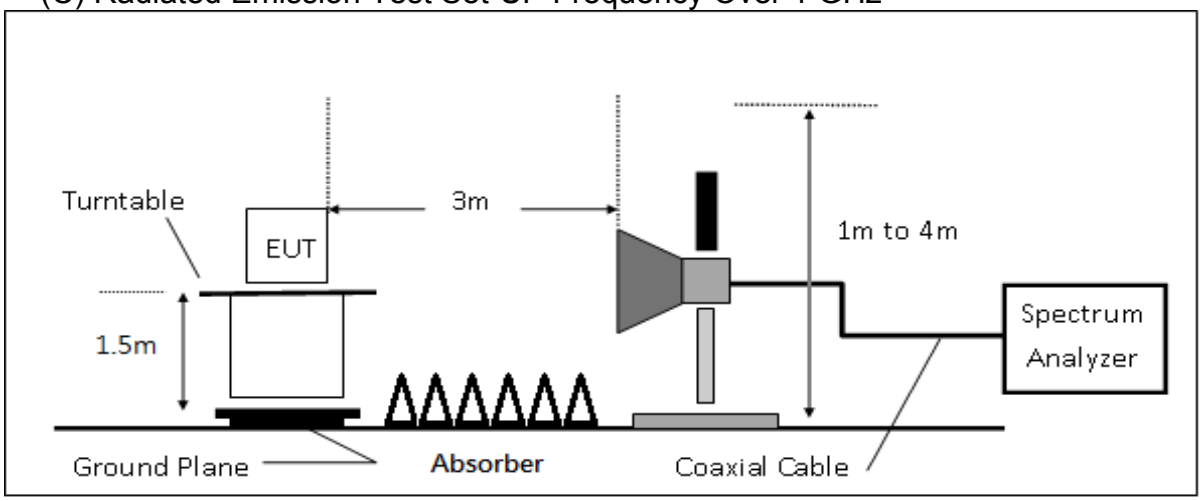
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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7.4 Measurement Procedure:

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
12. Repeat above procedures until all default test channel measured were complete.

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7.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

"**F**" : denotes Fundamental Frequency. ; "**H**" : denotes Harmonic Frequency.

"**E**" : denotes Band Edge Frequency. ; "**S**" : denotes Spurious Frequency.

7.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

7.7 Measurement Result:

Note: Refer to next page tabular data sheets.

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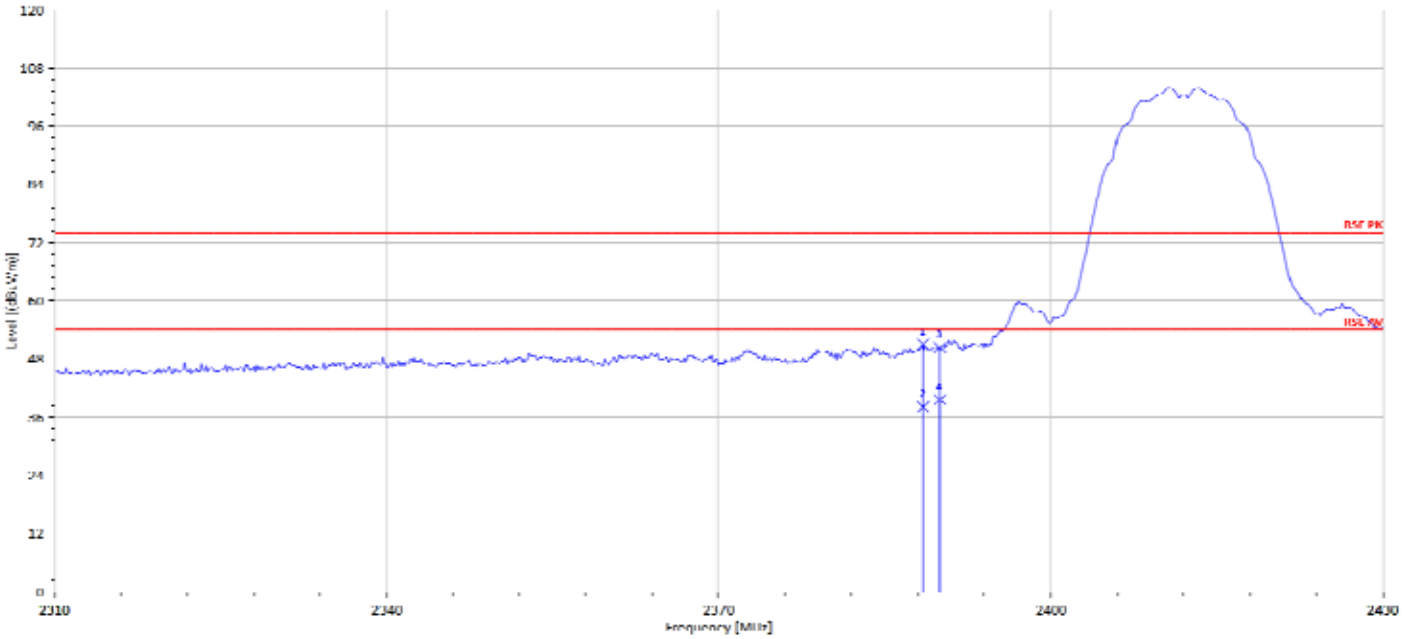
Radiated Band Edge Measurement Result: 802.11 b mode

Operation Mode :	802.11b	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2388.48	S	Peak	50.09	0.90	50.99	74	-23.01
2388.48	S	Average	37.15	0.90	38.05	54	-15.95
2390.00	E	Peak	49.34	0.92	50.26	74	-23.74
2390.00	E	Average	38.62	0.92	39.54	54	-14.46

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No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號
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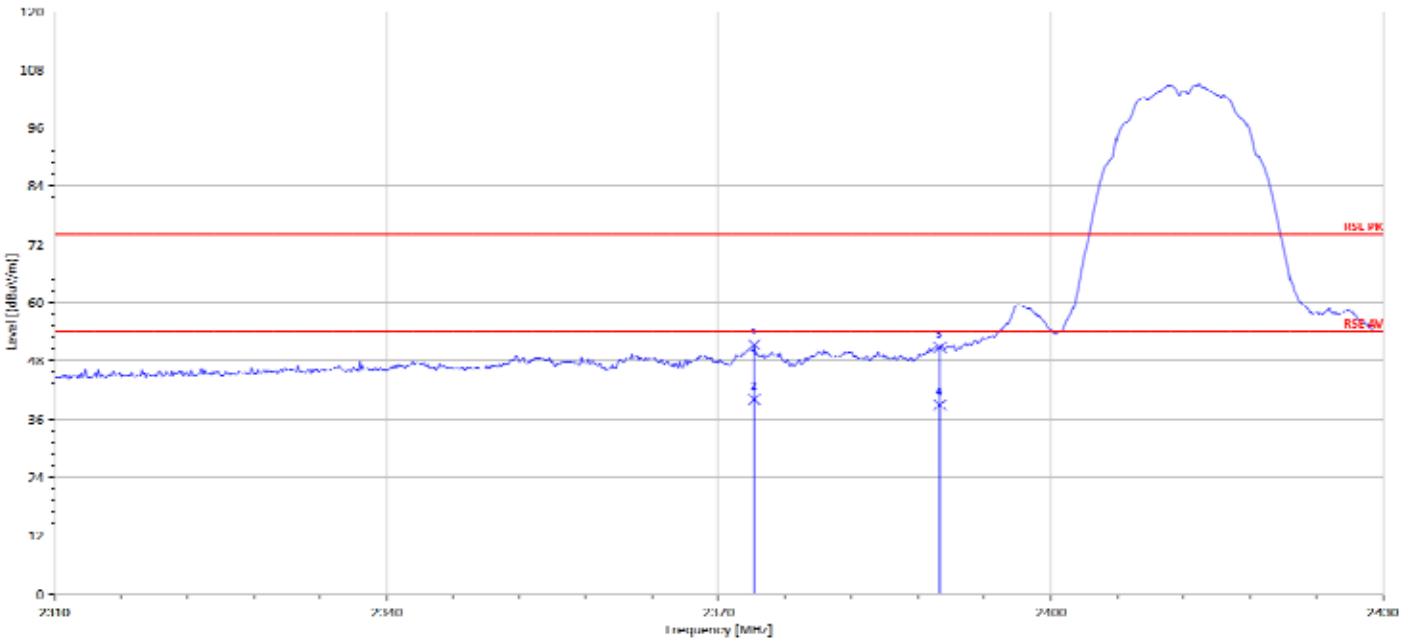
Member of SGS Group

Operation Mode :	802.11b	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2373.24	S	Peak	50.56	0.73	51.29	74	-22.71
2373.24	S	Average	39.30	0.73	40.03	54	-13.97
2390.00	E	Peak	49.84	0.92	50.77	74	-23.23
2390.00	E	Average	37.97	0.92	38.89	54	-15.11

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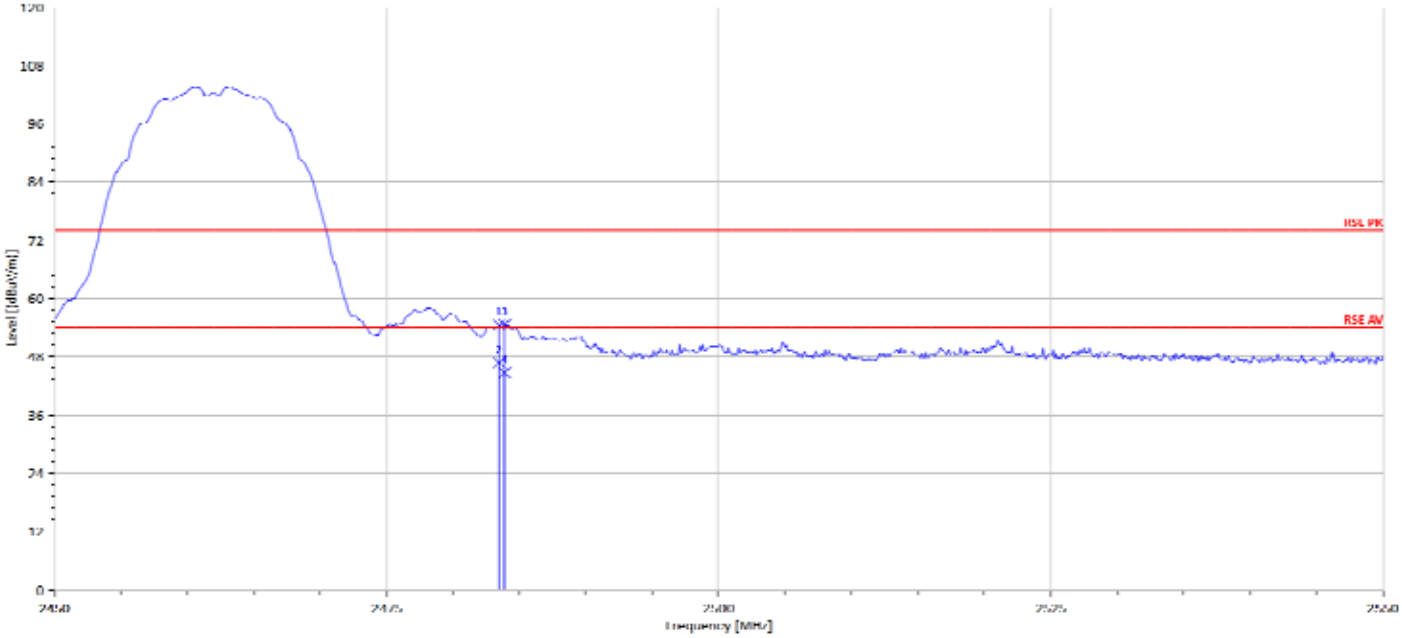
Operation Mode :	802.11b	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	53.35	1.16	54.51	74	-19.49
2483.50	E	Average	45.57	1.16	46.73	54	-7.27
2483.90	S	Peak	53.50	1.16	54.66	74	-19.34
2483.90	S	Average	43.54	1.16	44.70	54	-9.30

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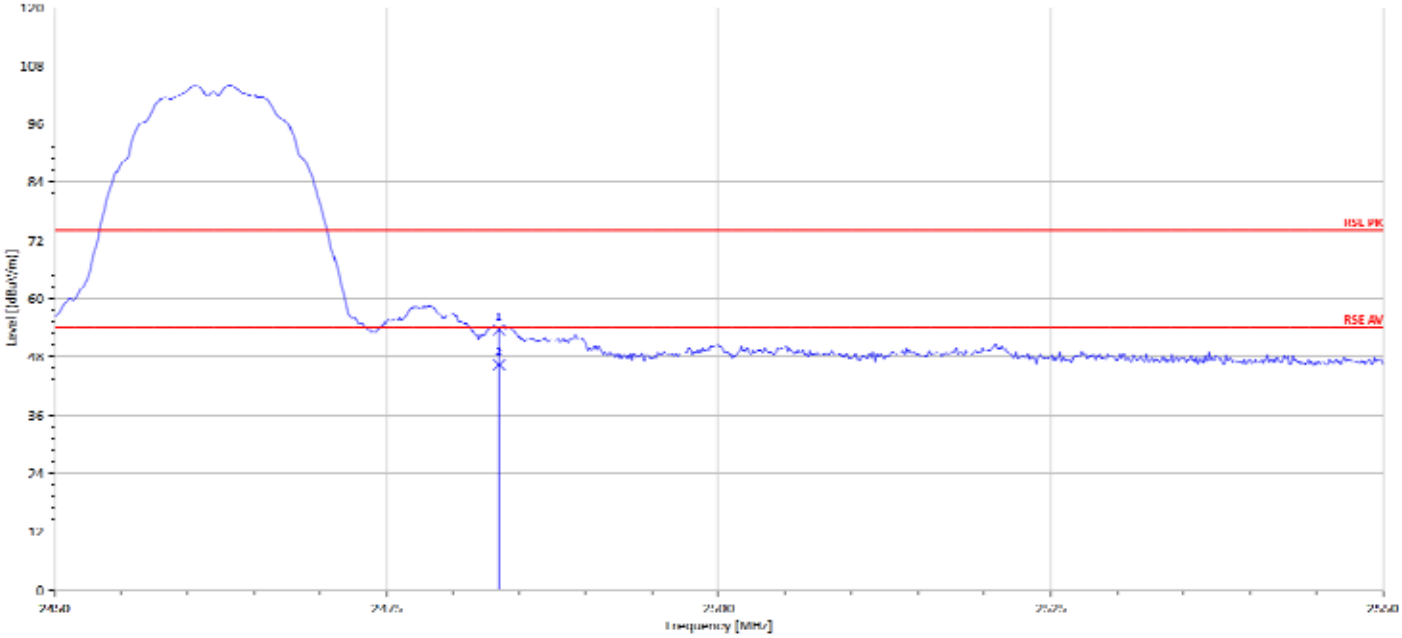
Operation Mode :	802.11b	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Peak	52.38	1.16	53.54	74	-20.46
2483.50	E	Average	45.15	1.16	46.31	54	-7.69

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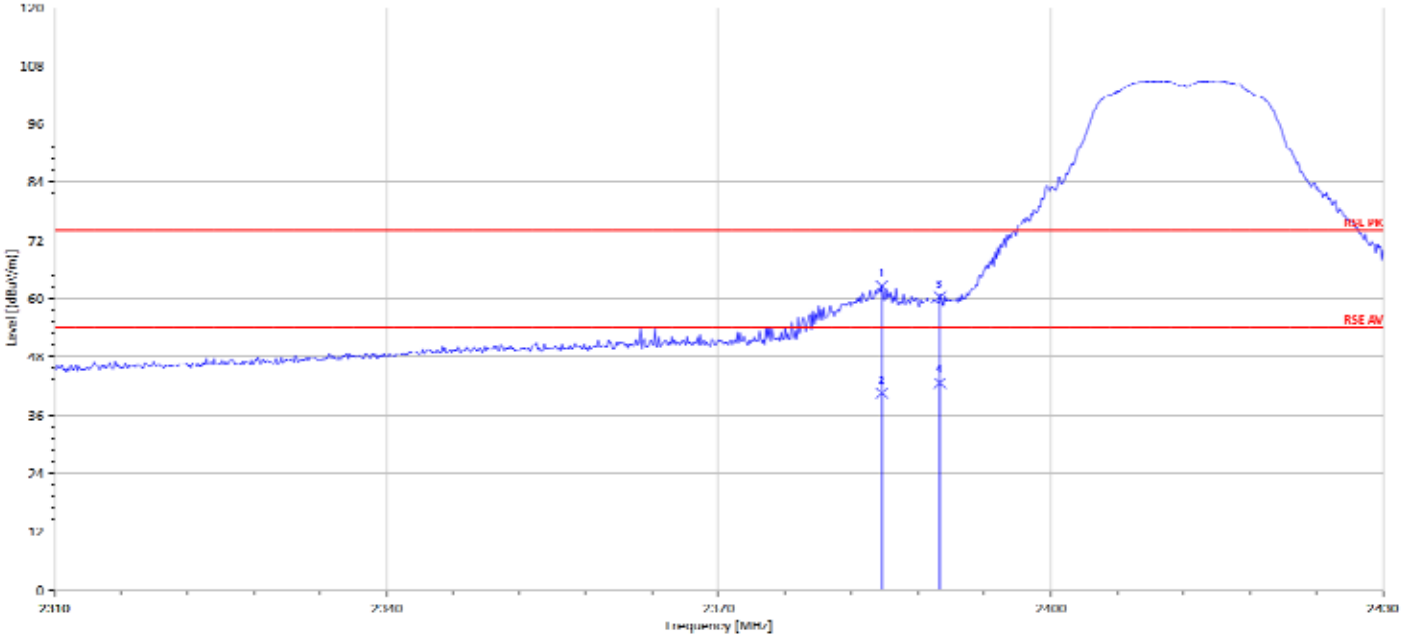
Operation Mode :	802.11g	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2384.76	S	Peak	61.71	0.85	62.55	74	-11.45
2384.76	S	Average	39.67	0.85	40.52	54	-13.48
2390.00	E	Peak	59.40	0.92	60.32	74	-13.68
2390.00	E	Average	41.65	0.92	42.57	54	-11.43

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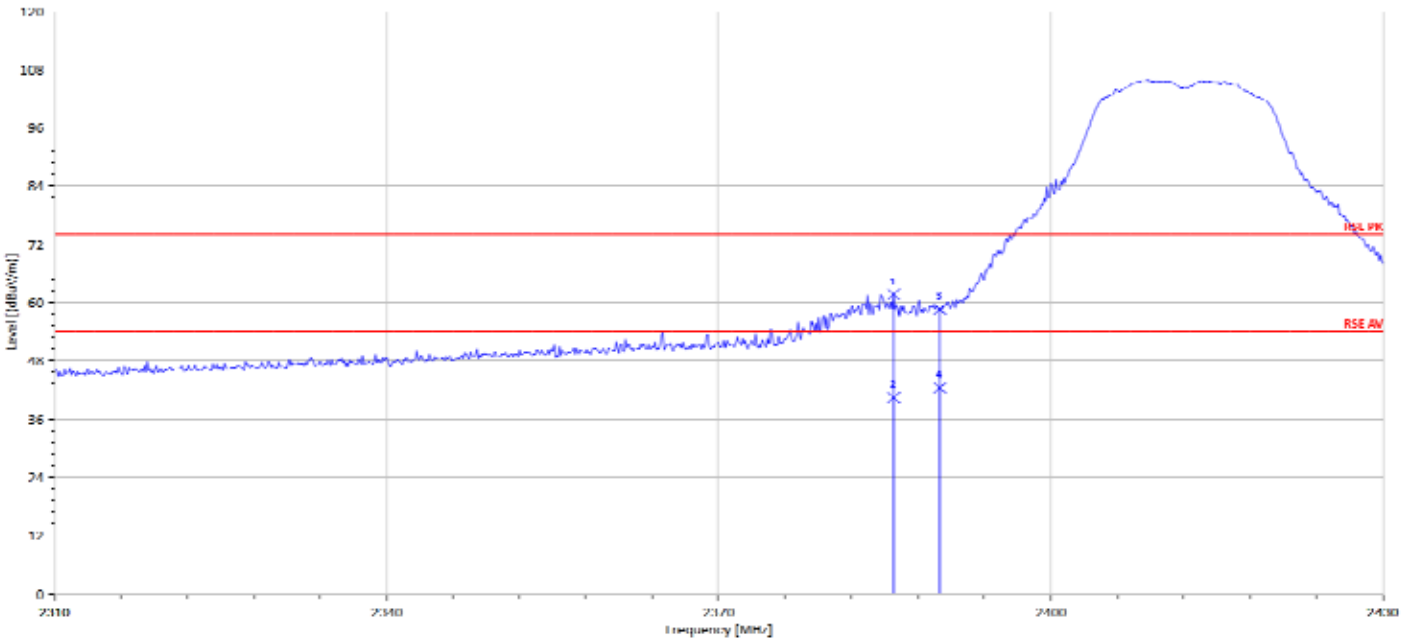
Operation Mode :	802.11g	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2385.84	S	Peak	60.78	0.86	61.64	74	-12.36
2385.84	S	Average	39.53	0.86	40.39	54	-13.61
2390.00	E	Peak	57.64	0.92	58.56	74	-15.44
2390.00	E	Average	41.49	0.92	42.41	54	-11.59

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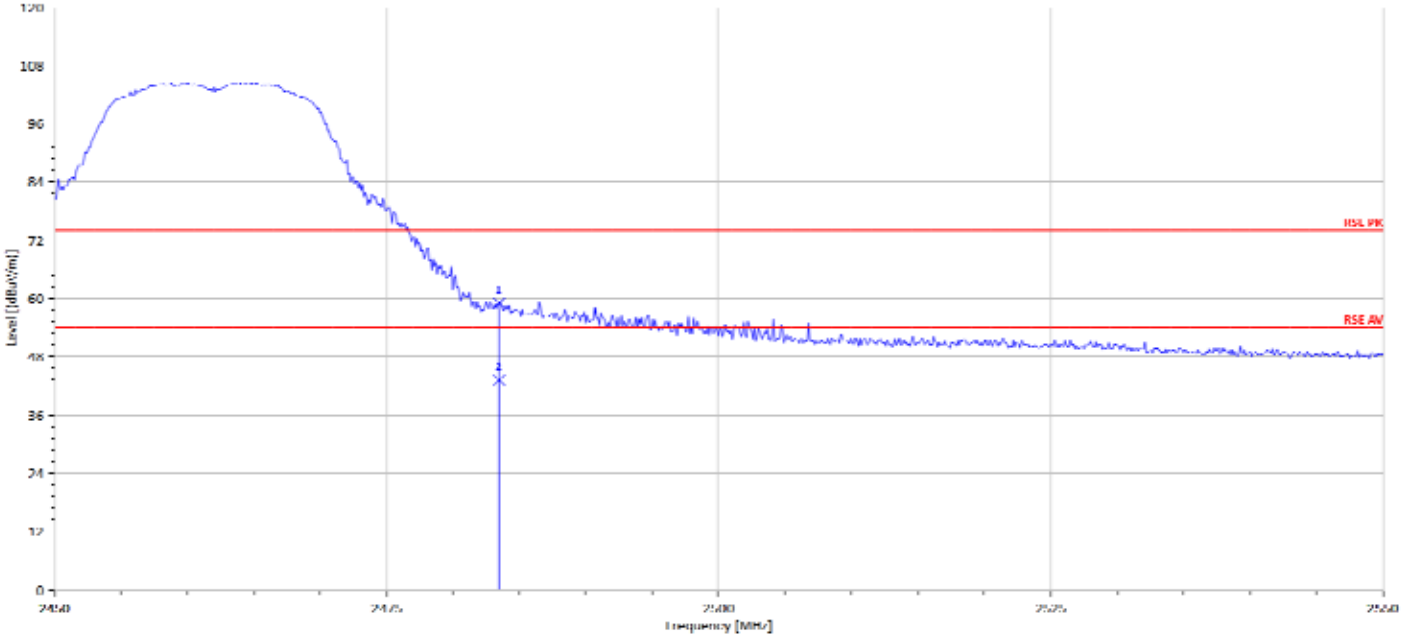
Operation Mode :	802.11g	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	57.88	1.16	59.04	74	-14.96
2483.50	E	Average	42.02	1.16	43.18	54	-10.82

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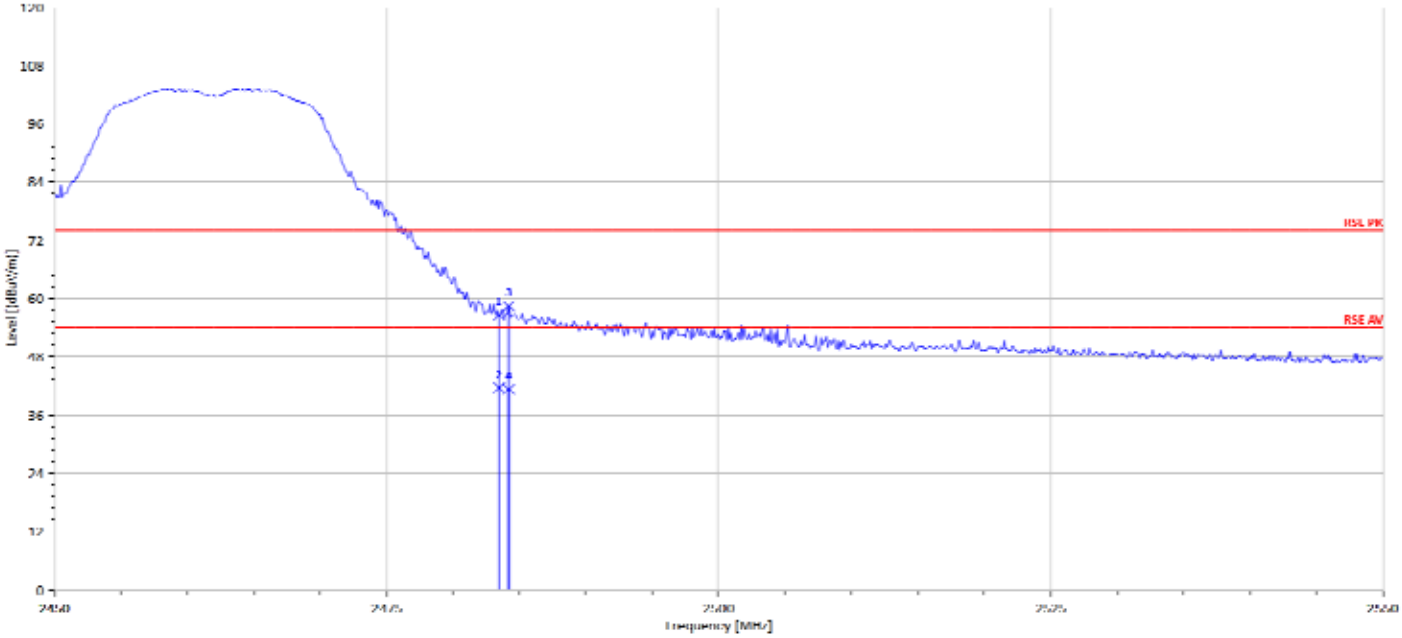
Operation Mode :	802.11g	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	55.38	1.16	56.54	74	-17.46
2483.50	E	Average	40.44	1.16	41.60	54	-12.40
2484.20	S	Peak	57.27	1.16	58.43	74	-15.57
2484.20	S	Average	40.15	1.16	41.31	54	-12.69

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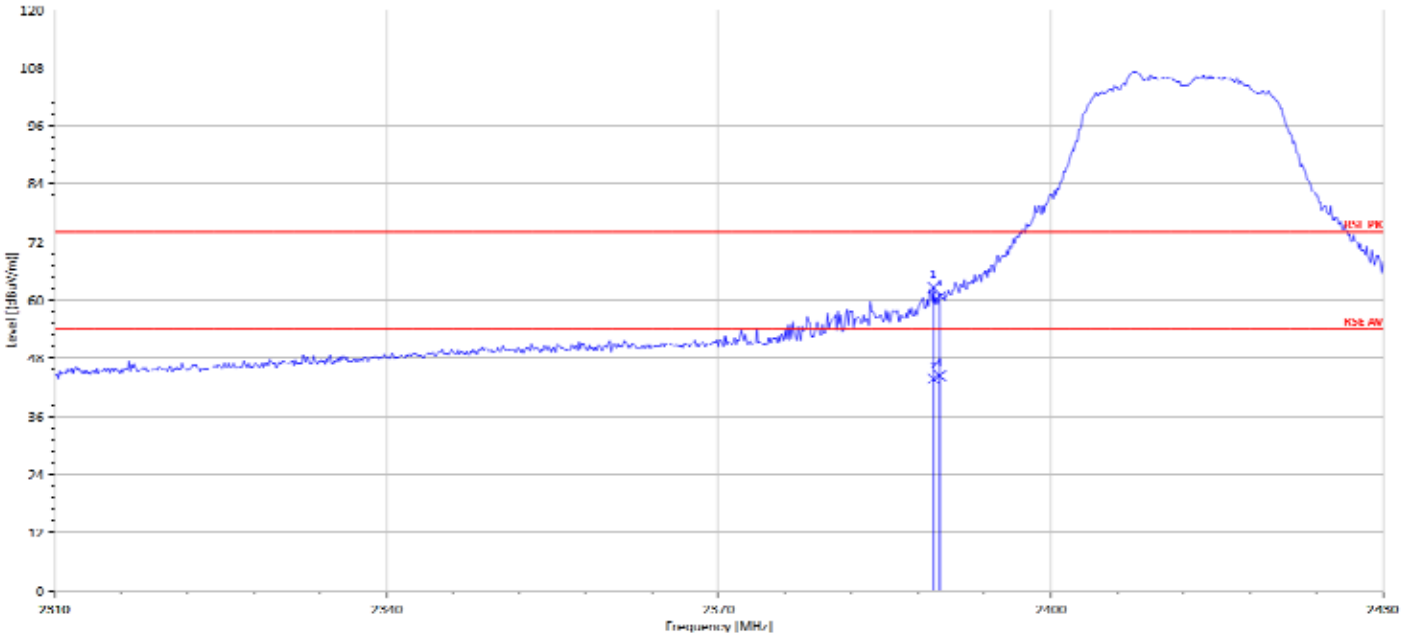
Radiated Band Edge Measurement Result (802.11n_HT20)

Operation Mode :	802.11n20	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.44	S	Peak	61.68	0.91	62.59	74	-11.41
2389.44	S	Average	42.84	0.91	43.75	54	-10.25
2390.00	E	Peak	59.96	0.92	60.88	74	-13.12
2390.00	E	Average	43.45	0.92	44.37	54	-9.63

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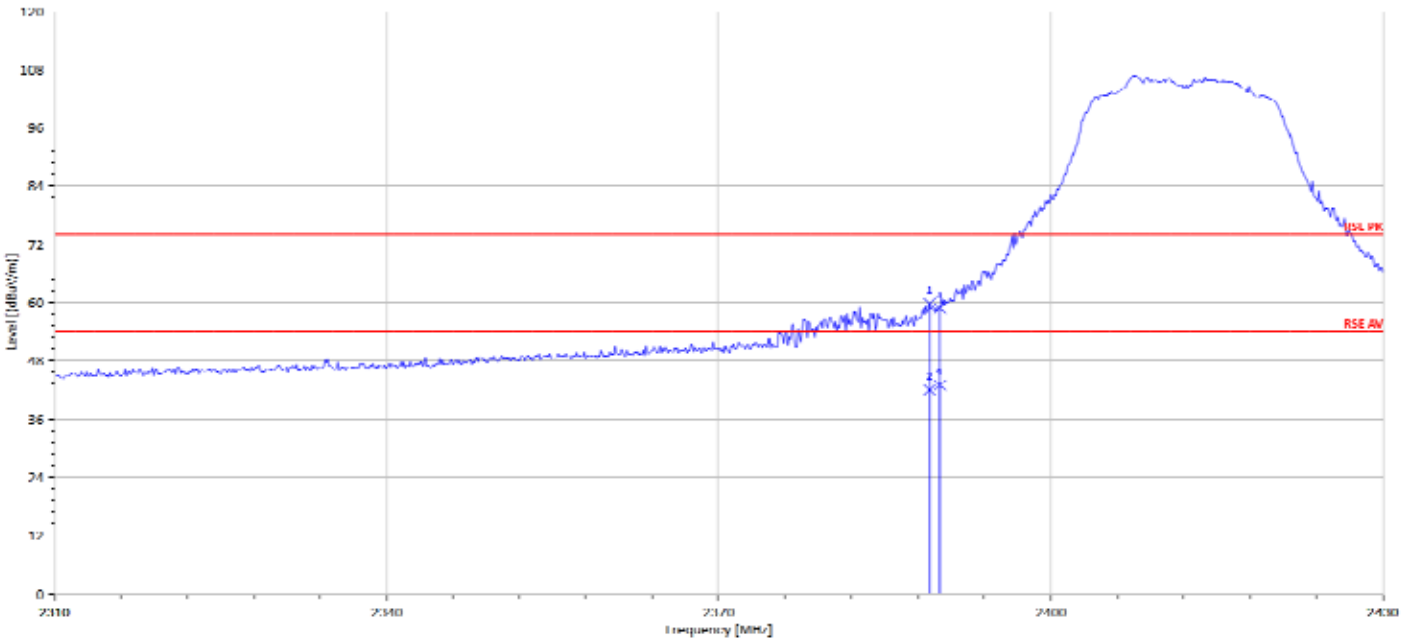
Operation Mode :	802.11n20	Test Date :	2017/3/30
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.08	S	Peak	58.83	0.91	59.74	74	-14.26
2389.08	S	Average	41.11	0.91	42.02	54	-11.98
2390.00	E	Peak	57.87	0.92	58.79	74	-15.21
2390.00	E	Average	42.05	0.92	42.97	54	-11.03

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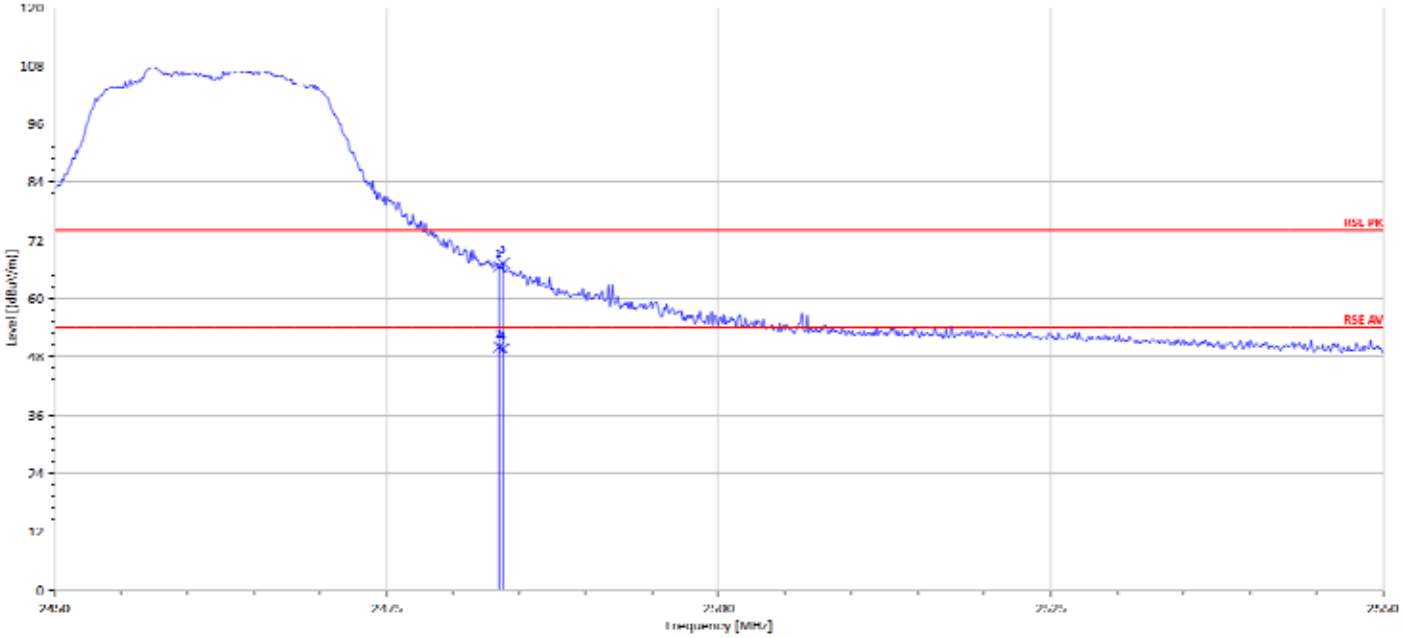
Operation Mode :	802.11n20	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	65.45	1.16	66.61	74	-7.39
2483.50	E	Average	48.86	1.16	50.02	54	-3.98
2483.80	S	Peak	66.10	1.16	67.26	74	-6.74
2483.80	S	Average	48.47	1.16	49.63	54	-4.37

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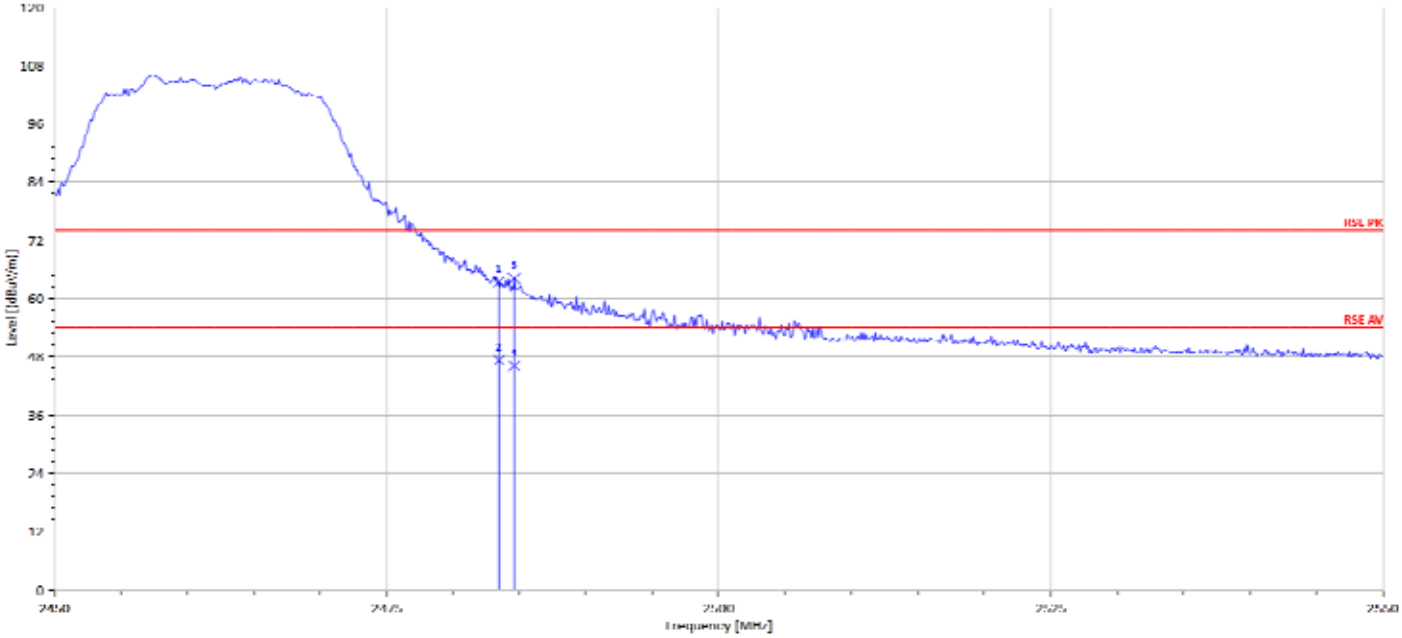
Operation Mode :	802.11n20	Test Date :	2017/3/30
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	62.33	1.16	63.49	74	-10.51
2483.50	E	Average	46.10	1.16	47.26	54	-6.74
2484.60	S	Peak	62.95	1.16	64.10	74	-9.90
2484.60	S	Average	44.96	1.16	46.12	54	-7.88

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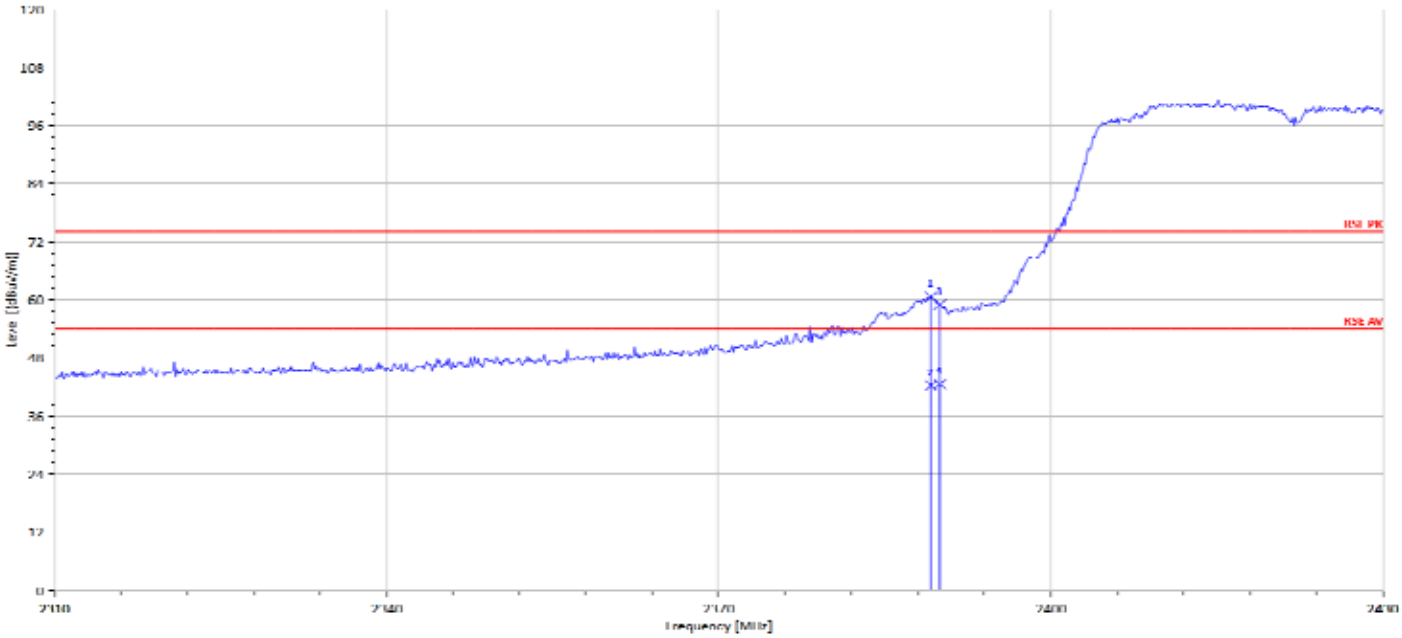
Member of SGS Group

Radiated Band Edge Measurement Result (802.11n_HT40)

Operation Mode :	802.11n40	Test Date :	2017/3/30
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2389.20	S	Peak	59.69	0.91	60.60	74	-13.40
2389.20	S	Average	41.39	0.91	42.30	54	-11.70
2390.00	E	Peak	58.07	0.92	59.00	74	-15.00
2390.00	E	Average	41.67	0.92	42.59	54	-11.41

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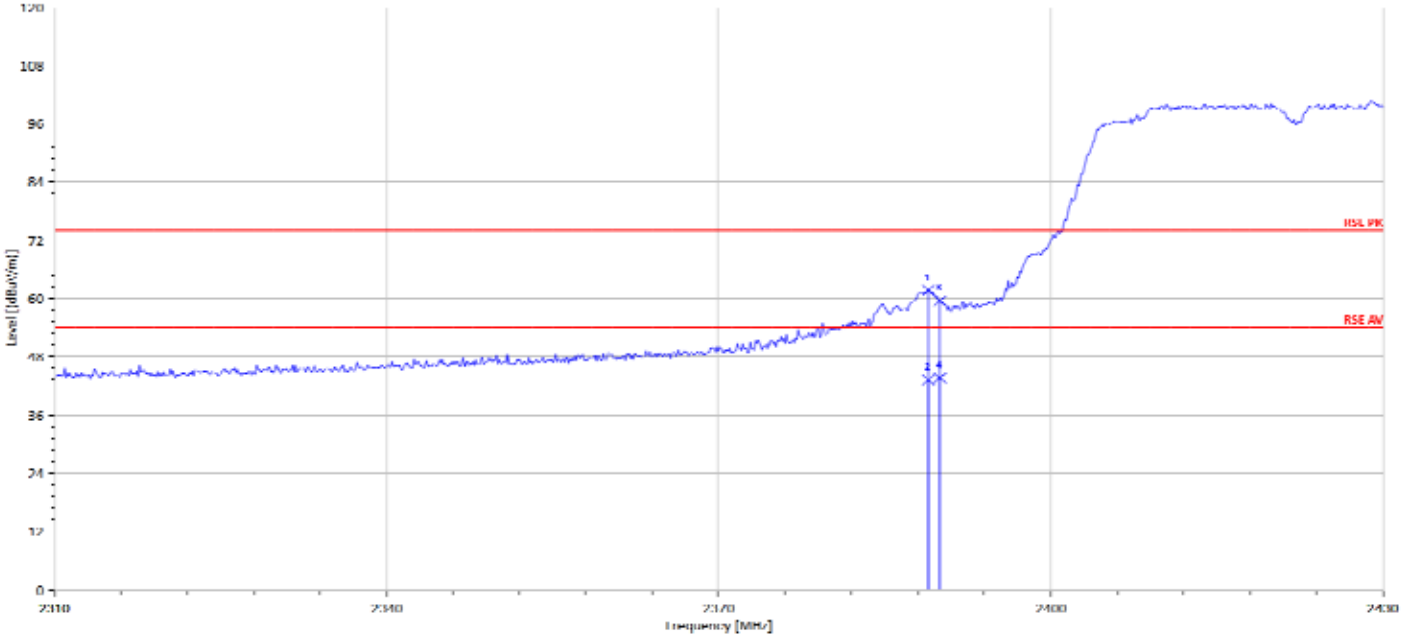
Operation Mode :	802.11n40	Test Date :	2017/3/30
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2388.96	S	Peak	60.75	0.91	61.65	74	-12.35
2388.96	S	Average	42.33	0.91	43.24	54	-10.76
2390.00	E	Peak	58.58	0.92	59.50	74	-14.50
2390.00	E	Average	42.71	0.92	43.63	54	-10.37

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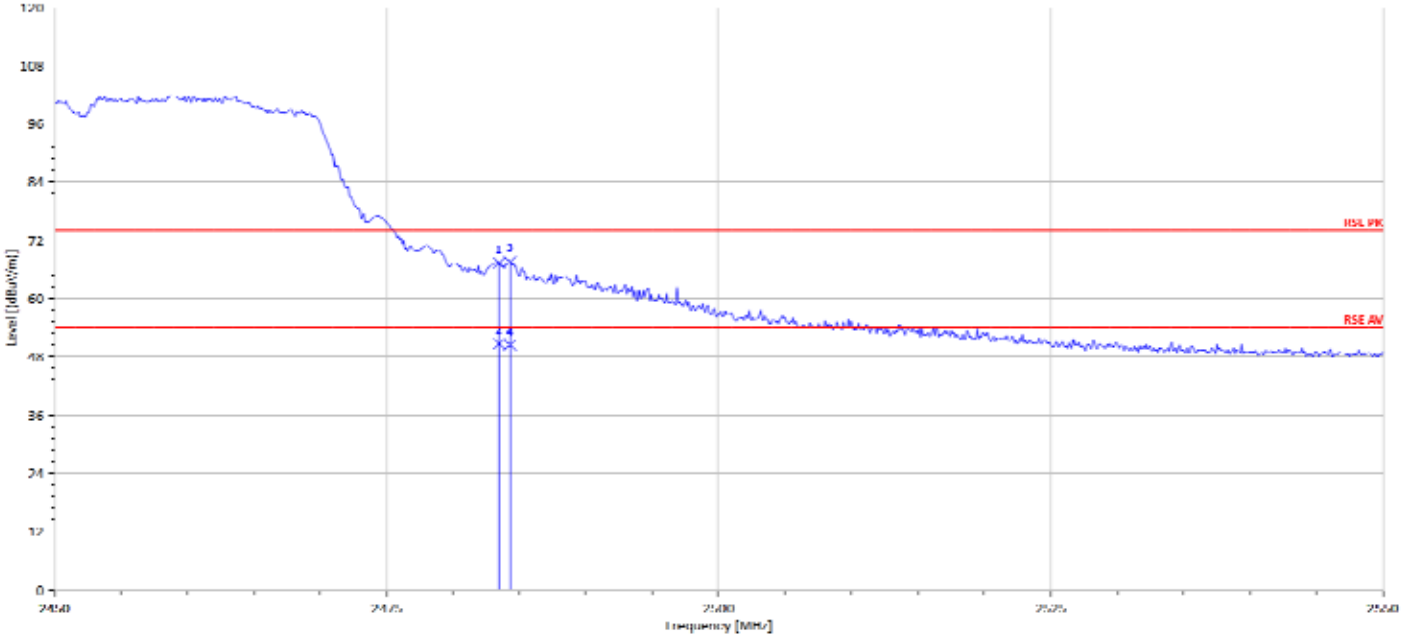
Operation Mode :	802.11n40	Test Date :	2017/3/30
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	66.13	1.16	67.29	74	-6.71
2483.50	E	Average	49.50	1.16	50.66	54	-3.34
2484.30	S	Peak	66.40	1.16	67.56	74	-6.44
2484.30	S	Average	49.26	1.16	50.42	54	-3.58

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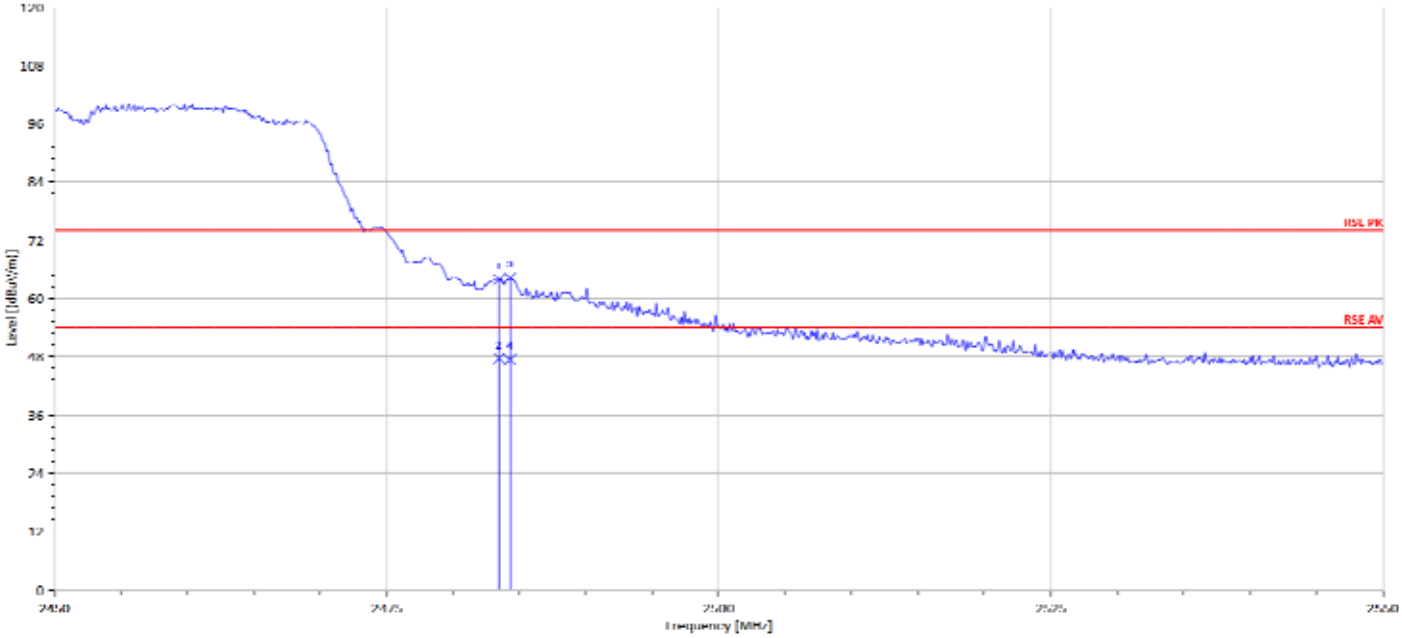
Operation Mode :	802.11n40	Test Date :	2017/3/30
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	E	Peak	62.76	1.16	63.92	74	-10.08
2483.50	E	Average	46.50	1.16	47.66	54	-6.34
2484.30	S	Peak	63.14	1.16	64.30	74	-9.70
2484.30	S	Average	46.24	1.16	47.40	54	-6.60

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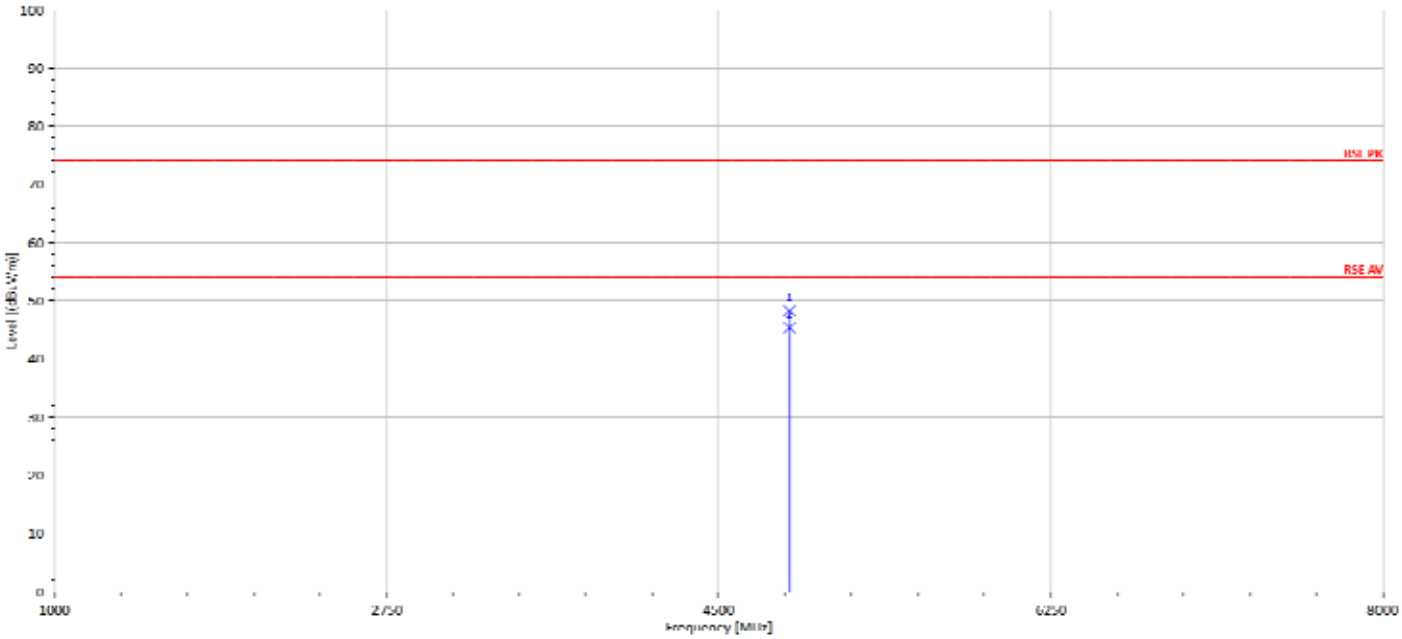
Above 1GHz Data:
Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode :	802.11b	Test Date :	2017/3/31
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	40.38	7.86	48.23	74	-25.77
4874.00	H	Average	37.48	7.86	45.34	54	-8.66

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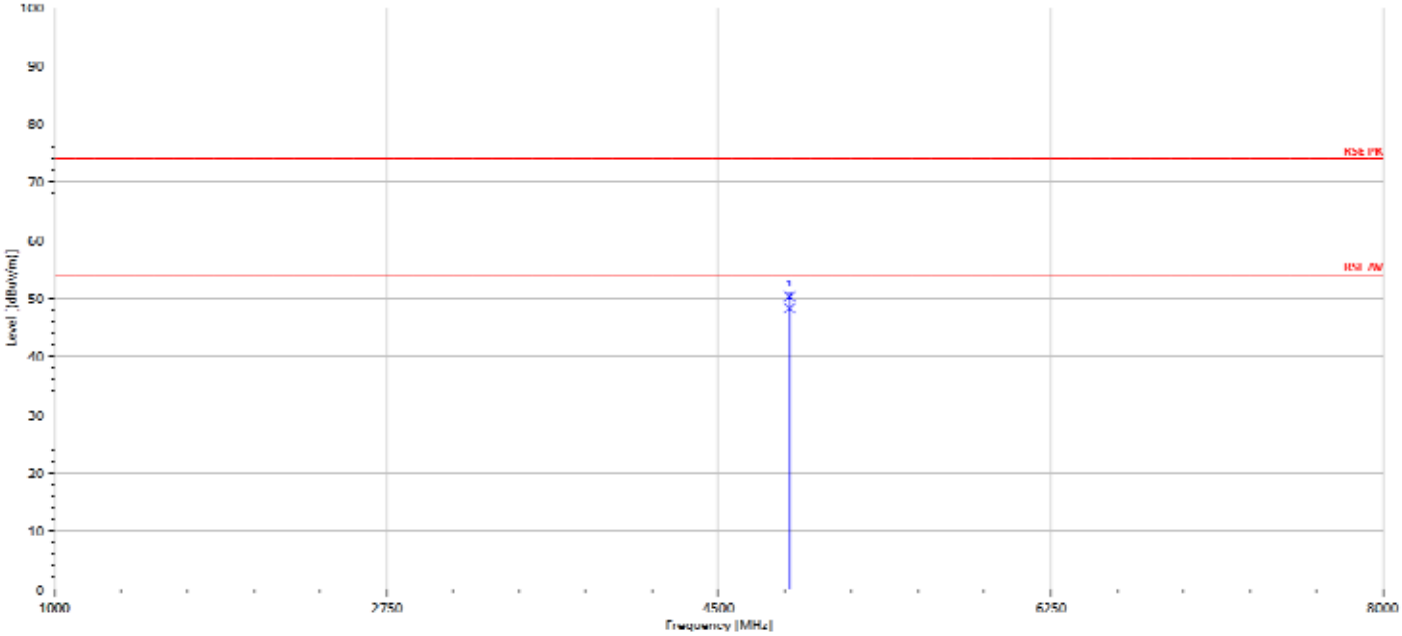
Operation Mode :	802.11b	Test Date :	2017/3/31
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Penny
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4874.00	H	Peak	42.40	7.87	50.27	74	-23.73
4874.00	H	Average	40.40	7.87	48.27	54	-5.73

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8 ANTENNA REQUIREMENT

8.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

8.2 Antenna Connected Construction:

An embedded-in antenna design is used.
The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.
The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

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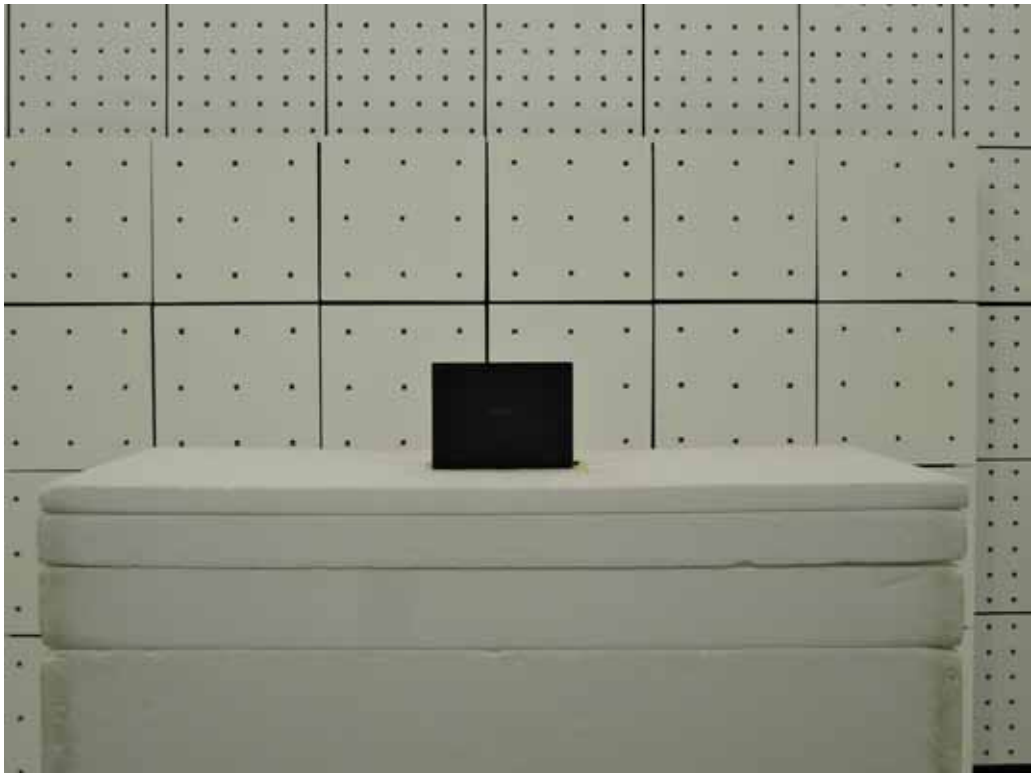
PHOTOGRAPHS OF SET UP

Radiated Emission Set up Photos (Above 1GHz)



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PHOTOGRAPHS OF EUT

Please refer to the attached file(EUT Photo)

~ End of Report ~

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